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Molecular  
weight scale +

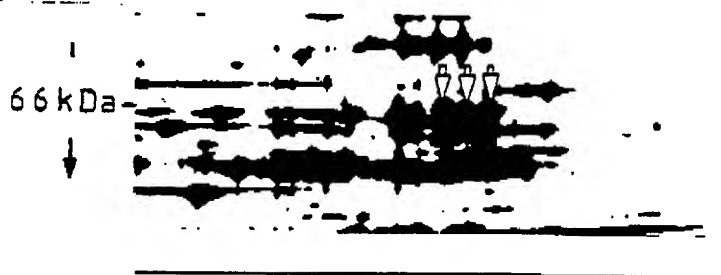


FIG. 1A

66 kDa -



FIG. 1B

66 kDa -

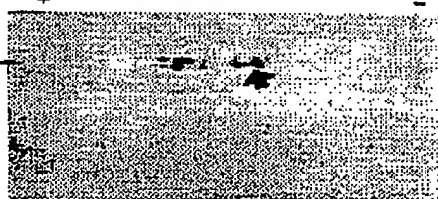


FIG. 2A

Molecular  
weight scale ↓

66 kDa -

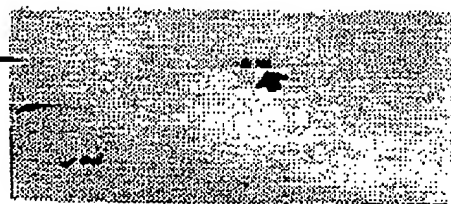


FIG. 2B

CV<sub>2</sub> antigen (POP 66/ULIP4)

a b c d

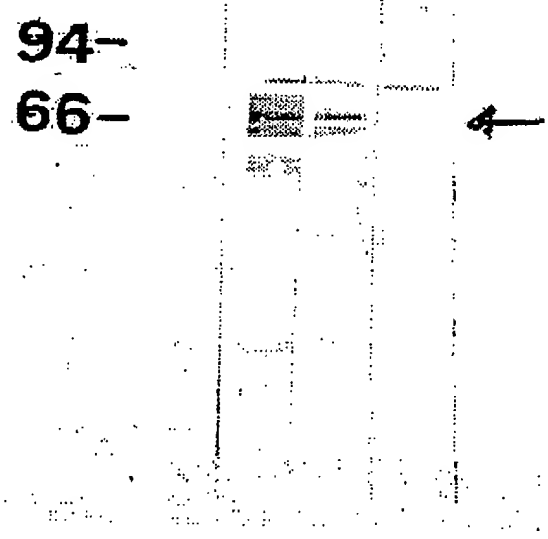
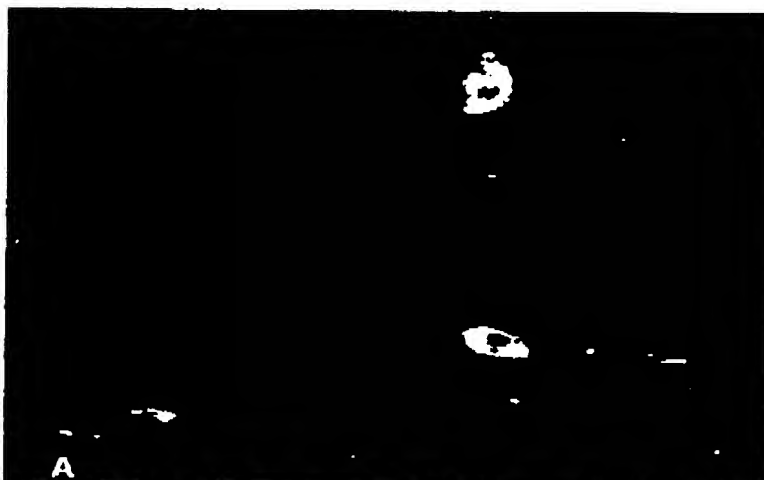


FIG. 3

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FIG. 4AFIG. 4BFIG. 4C

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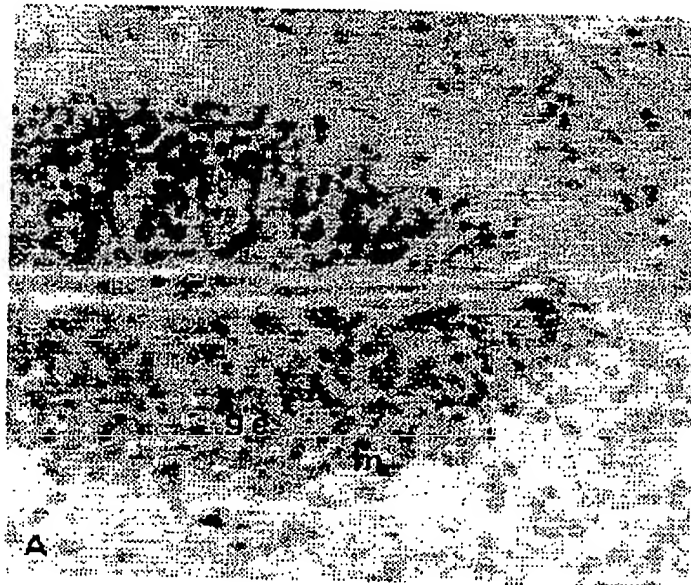


FIG. 5A

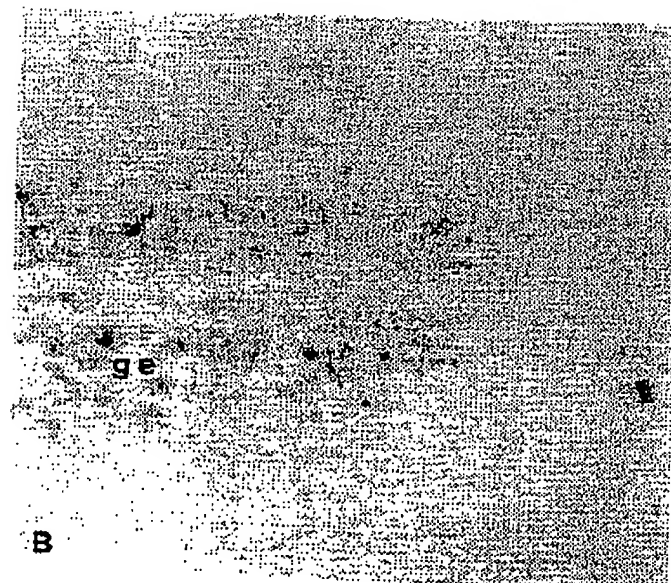


FIG. 5B

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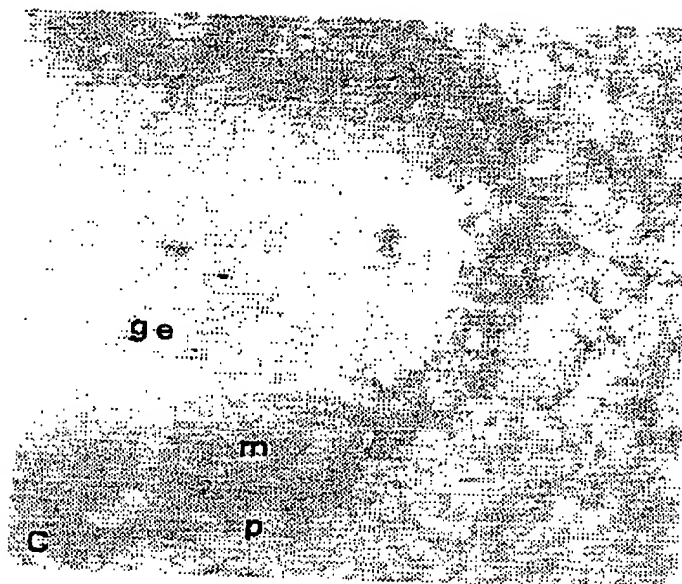


FIG. 5C

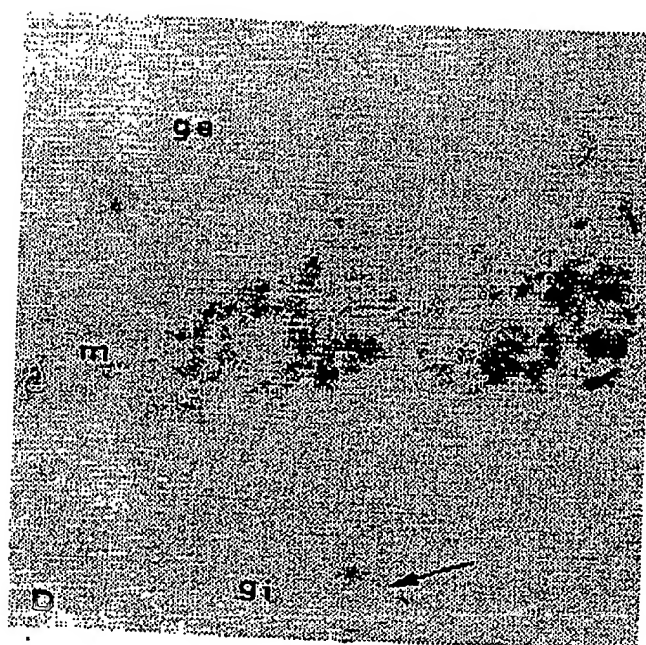


FIG. 5D

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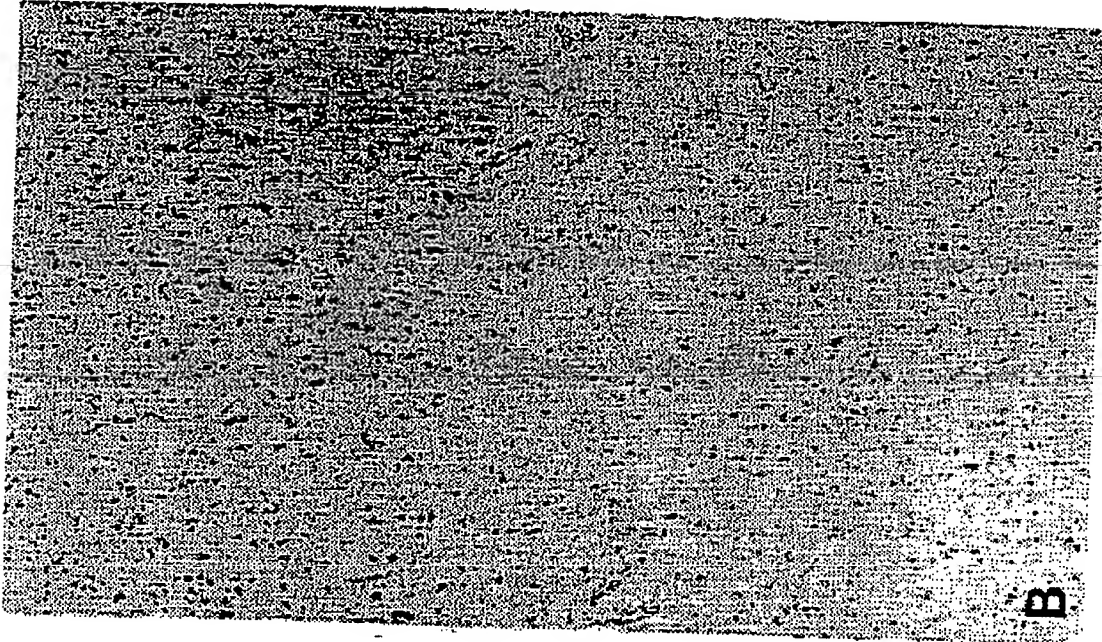


FIG. 6B

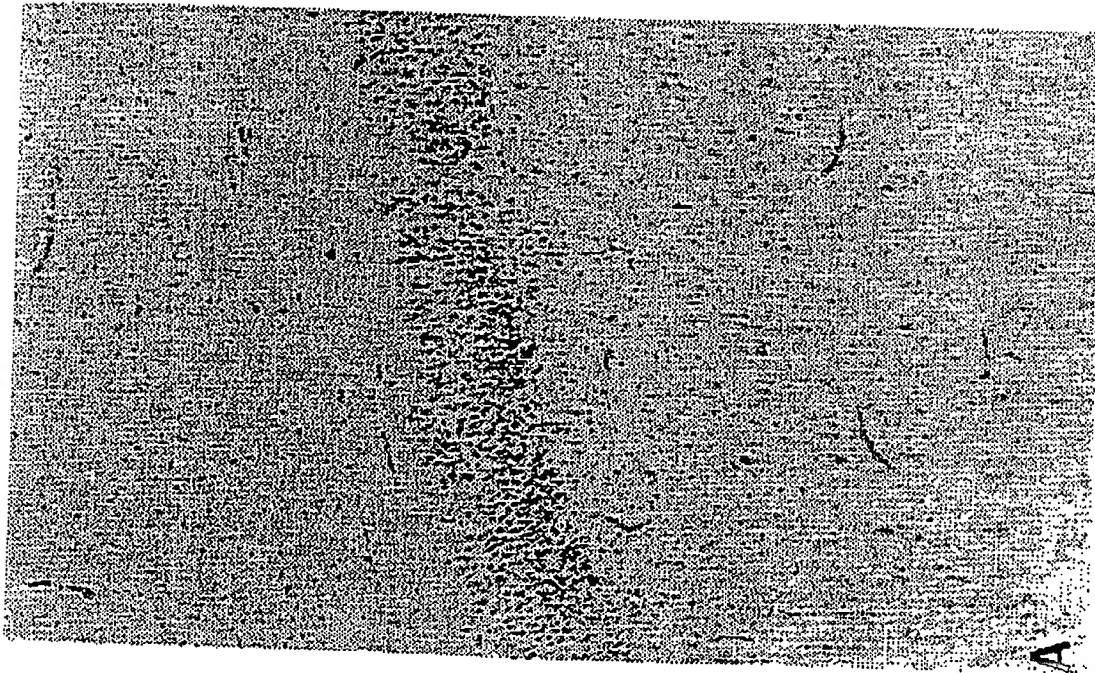
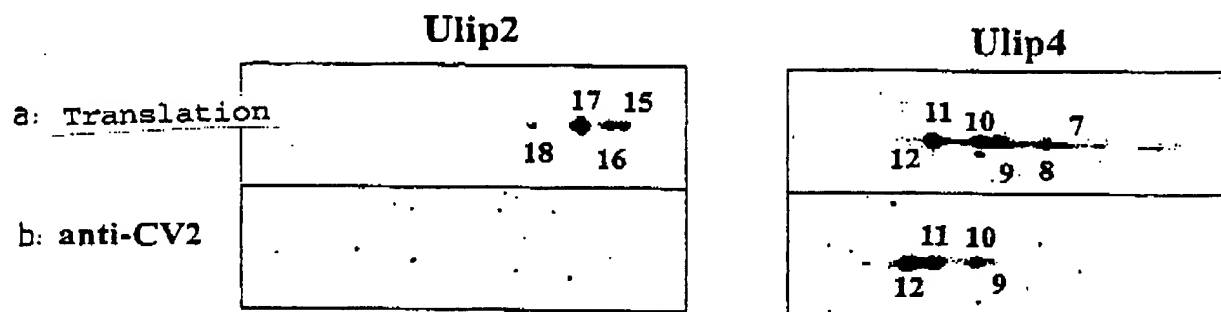
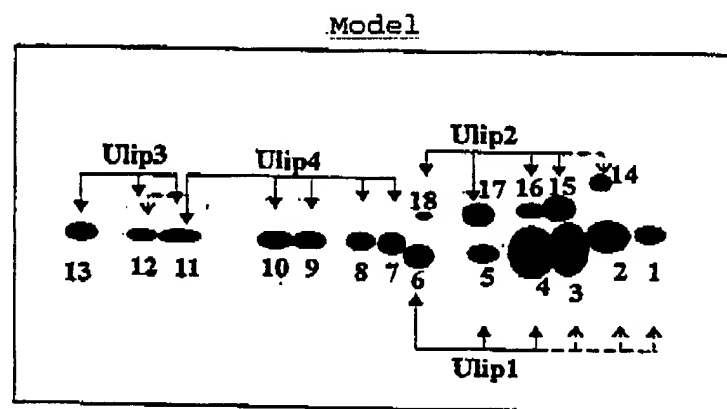


FIG. 6A

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FIG. 7AFIG. 7BFIG. 7C

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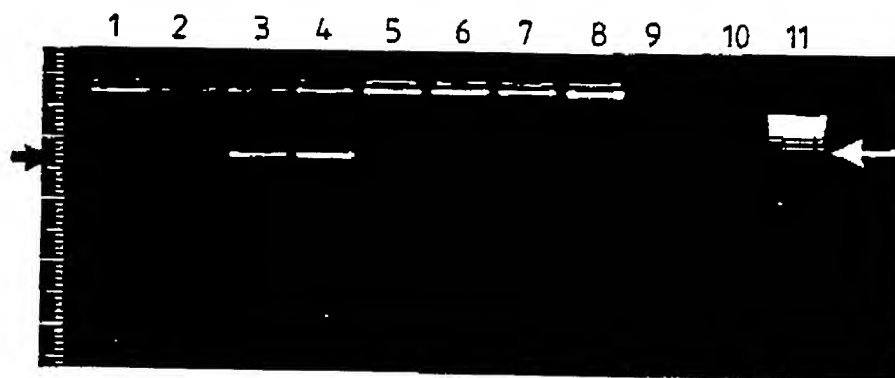


FIG. 8A

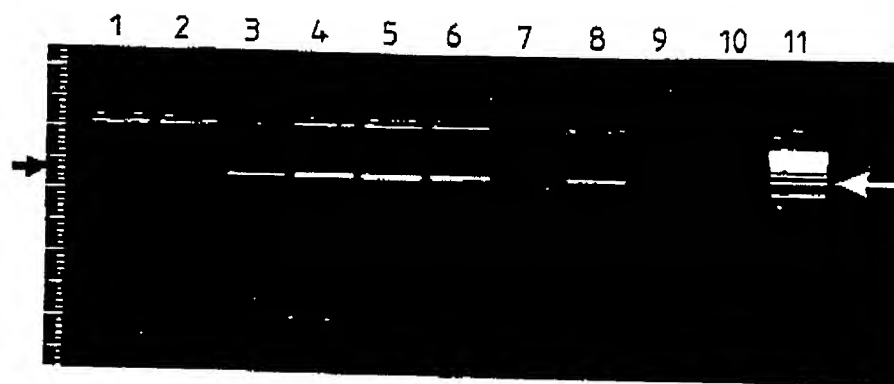


FIG. 8B



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## DLIP2 mouse

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M S Y Q G K K N I P P I 12
cttcctcccccccgagag ATG TCT TAT CAG GGG AAG AAA AAT ATT CCA CCC ATC 58

T S D R L L I K G G K I V N D D Q S 30
ACG AGC GAT CGT CTT CTG ATC AAA GGT GGC AAG ATT GTG AAT GAT GAC CAG TCC 112

F Y A D I Y M E D G L I K Q I G E N 48
TTC TAT GCA GAC ATA TAC ATG GAA GAT GGG TTG ATC AAG CAA ATA GGA GAA AAC 166

L I V P G G V K T I E A H S R M V I 66
CTG ATT GTA CCA GGA GGG GTG AAG ACC ATC GAA GCC CAC TCC AGA ATG GTG ATT 220

P G G I D V H T R F Q M P D Q G M T 84
CCC GGA GGA ATT GAC GTG CAT ACT CGC TTC CAG ATG CCT GAC CAG GGA ATG ACA 274

S A D D F F Q G T K A A L A G G T T 102
TCC GCT GAT GAC TTC TTC CAG GGA ACC AAG GCG GCC CTG GCC GGG GGA ACC ACC 328

M I I D H V V P E P G T S L L A A F 120
ATG ATC ATT GAC CAT GTT GTT CCT GAG CCC GGG ACG AGC CTA TTG GCT GCC TTT 382

D Q W R E W A D S K S C C D Y S L H 138
GAT CAG TGG AGG GAG TGG GCT GAC AGC AAG TCC TGC TGT GAC TAT TCG CTG CAC 436

V D I T E W H K G I Q E E M E A L V 156
GTG GAC ATC ACT GAG TGG CAC AAG GGC ATC CAG GAG GAG ATG GAA GCT CTG GTG 490

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FIG.9

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K D H G V N S F L V Y M A F K D R F	174
AAG GAC CAC GGG GTA AAC TCC TTC CTG TAC ATG GCT TTC AAA GAT CGA TTC	544
Q L T D S Q I Y E V L S V I R D I G	192
CAG CTG ACG GAT TCC CAG ATC TAT GAA GTG CTG AGC GTG ATC CGG GAT ATC GGT	598
A I A Q V H A E N G D I I A E A Q Q	210
GCC ATA GCT CAA GTC CAC GCA GAG AAT GGT GAC ATC ATT GCT GAG GCA CAG CAG	652
R I L D L G I T G P E G H V L S R P	228
AGG ATC CTG GAT CTG GGC ATC ACG GGC CCC GAG GGA CAC GTG TTG AGC CGG CCA	706
E E V E A E A V N R S I T I A N Q T	246
GAG GAG GTC GAG GCT GAA GCT GTG AAC CGG TCC ATC ACT ATT GCC AAC CAG ACC	760
N C P L Y V T K V M P K S A A E V I	264
AAC TGC CCT CTG TAT GTC ACC AAA GTG ATG CCC AAG AGT GCG GCT GAA GTC ATC	814
A Q A R K K G T V V Y G E P I T A S	282
GCT CAG GCA CGG AAG AAG GGA ACT GTG GTG TAT GGT GAG CCC ATC ACG GCC AGC	868
L G T D G S H Y W S K N W A K A A A	300
CTG GGG ACT GAT GGC TCT CAT TAC TGG AGC AAC TGG GCC AAG GCT GCG GCC	922
F V T S P P L S P D P T T P D F L N	318
TTT GTC ACC TCC CCA CCC TTG AGC CCC GAC CCA ACC ACT CCA GAC TTT CTC AAC	976
S L L S C G D L Q V T G S A H C T F	336
TCG TTG CTG TCC TGT GGA GAC CTC CAA GTC ACT GGC AGT GCC CAC TGC ACC TTC	1030

FIG. 9 continued

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N T A Q K A V G G K D N F T L I P E G 354  
 AAC ACT GCC CAG AAG GCT GTG GGG AAG GAC AAC TTC ACC TTG ATT CCC GAG GGC 1084

T N G T E E R M S V I W D K A V V T 372  
 ACC AAC GGC ACT GAG GAG CGG ATG TCT GTG ATG TGG GAT AAA GCT GTG GTC ACT 1138

G K M D E N Q F V A V T S T N A A K 390  
 GGG AAG ATG GAT GAG AAT CAG TTT GTG GCT GTG ACC AGC ACC AAC GCA GCC AAA 1192

V F N L Y P R K G R I S V G S D A D 408  
 GTC TTC AAC CTT TAC CCC CGG AAA GGT CGC ATC TCG GTG GGA TCT GAT GCT GAC 1246

L V I W D P D S V K T I S A K T H N 426  
 TTG GTC ATC TGG GAC CCT GAC AGT GTG AAG ACC ATC TCT GCC AAG ACA CAC AAC 1300

S A L E Y N I F E G M E C R G S P L 444  
 AGT GCT CTT GAG TAC AAC ATC TTT GAA GGC ATG GAG TGT CGC GGC TCC CCA CTG 1354

V V I S Q G K I V L E D G T L H V T 462  
 GTG GTC ATC AGC CAG GGC AAG ATT GTC CTG GAG GAC GGC ACA CTT CAT GTC ACT 1408

E G S G R Y I P R K P F P D F V Y K 480  
 GAA GGC TCA GGA CGC TAC ATT CCC CGG AAG CCC TTC CCT GAC TTT GTG TAC AAA 1462

R I K A R S R L A E L R G V P R G L 498  
 CGC ATC AAA GCA AGG AGC AGG CTG GCT GAG CTG AGA GGG GTC CCT CGT GGC CTG 1516

Y D G P V C E V S V T P K T V T P A 516  
 TAT GAC GGA CCG GTA TGC GAG GTG TCT GTG ACG CCC AAG ACG GTG ACT CCA GCC 1570

**FIG.9** continued

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[illegible]

FIG. 9 continued

FIG. 10

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S C C D Y S L H V D I T S W Y D G V 148  
TCC TGC TGT GAC TAT TCC CTC CAC GTG GAC ATC ACA AGC TGG TAT GAT GGT GTT 713

R E E L E V L V Q D K G V N S F Q V 166  
CGG GAA GAG CTG GAG GTG CTG GTG CAG GAC AAA GGT GTC AAC TCC TTC CAA GTC 767

Y M A Y K D L Y Q M S D S Q L Y E A 184  
TAC ATG GCG TAT AAG GAC GAC CTG TAC CAG ATG TCT GAC AGC CAG CTG TAT GAA GCC 821

F T F L K G L G A V I L V H A E N G 202  
TTC ACC TTC CTT AAG GGT TTG GGA GCT GTG ATC TTA GTC CAT GCA GAA AAT GGA 875

D L I A Q E Q K R I L E M G I T G P 220  
GAT TTG ATA GCT CAG GAA CAA AAA CGG ATC CTG GAG ATG GGC ATC ACG GGT CCC 929

E G H A L S R P E E L E A E A V F R 238  
GAG GGT CAT GCT CTG AGC AGA CCC GAG GAG CTG GAG GCC GAG GCT GTG TTC CGG 983

A I A I A G R I N C P V Y I T K V M 256  
GCT ATT GCC ATT GCA GGC CGG ATC AAT TGC CCT GTG TAC ATC ACC AAG GTC ATG 1037

S K S A A D I I A L A R K K G P L V 274  
AGC AAG AGT GCA GCG GAC ATC ATC GCA CTG GCC AGG AAG AAA GGC CCT CTT GTC 1091

F G E P I A A S L G T D G T H Y W S 292  
TTC GGT GAG CCC ATA GCC GCC AGC CTG GGA ACC GAT GGC ACC CAC TAC TGG AGC 1145

K N W A K A A A F V T S P L S P D 310  
AAG AAC TGG GCC AAG GCA GCT GCA TTT GTG ACT TCC CCT CCC CTG AGC CCA GAC 1199

**FIG.10** continued

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P T T P D Y L T S L L A C G D L Q V 328  
CCC ACC ACT CCT GAC TAC TTG ACC TCC TTG CTG GCC TGT GGA GAC TTG CAG GTC 1253

T G S G H C P Y S I A Q K A V G K D 346  
ACA GGT AGT GGC CAC TGT CCC TAC AGT ATT GCT CAG AAG GCT GTG GGC AAG GAC 1307

N F T L I P E G V N G I E E R M T V 364  
AAC TTC ACT CTG ATC CCT GAG GGT GTC AAT GGT ATA GAA GAG CCG ATG ACC GTT 1361

V W D K A V A T G K M D E N Q F V A 382  
GTC TGG GAC AAG GCA GTG GCT ACT GGC AAG ATG GAT GAG AAC CAG TTT GTA GCC 1415

V T S T N A A K I F N L Y P R K G R 400  
GTC ACC AGC ACC AAC GCA GCC AAG ATC TTC AAC CTG TAC CCG AGG AAA GGT CGG 1469

I A V G S D A D V V I W D P D K M K 418  
ATC GCT GTG GGC TCC GAT GAT GAC GTA GTC ATC TGG GAC CCA GAT AAG ATG AAG 1523

T I T A K S H K S T V E Y N I F E G 436  
ACC ATA ACA GCC AAA AGC CAT AAA TCA ACT GTG GAG TAC AAC ATC TTT GAG GGC 1577

M E C H G S P L V V I S Q G K I V F 454  
ATG GAG TGC CAC GGC TCC CCC CTG GTG GTC ATC AGT CAG GGC AAG ATT GTC TTT 1631

E D G N I S V S K G M G R F I P R K 472  
GAG GAT GGA AAC ATC AGT GTC AGC AAG GGC ATG GGC CGC TTC ATC CCT CGG AAG 1685

P F P E H L Y Q R V R I R S K V F G 490  
CCA TTC CCA GAG CAT CTC TAC CAG CGT GTC AGG ATC AGA AGC AAG GAT TTC GGC 1739

**FIG.10** continued

**FIG. 10** continued



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ULP4 mouse

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gctgactaatatgcttaaatcagcgggtcgccacgtctgtggtcggtacgtccacgcccgcgagccccctacc 72
gaggacactcagccccgcgtgtatcagg  M S F Q G K K S I P 10
                                ATG TTC CAA GGC AAG AAG AGC ATT CCC 131
R I T S D R L L I K G G K I V N D D 28
CGG ATA ACG AGC GAC CGC CTT CTC ATC AAA GGT GGG AAG ATT GTG AAC GAT GAC 185
Q S F H A D L Y V E D G L I K Q I G 46
CAG TCC TTT CAT GCT GAT CTG TAT GTG GAA GAC GGT CTG ATT AAA CAA ATT GGA 239
E N L I V P G G I K T I D A H G L M 64
GAA AAT CTC ATC GTC CCT GGC GGC ATC AAA ACC ATC GAT GCT CAT GGC CTG ATG 293
V L P G G V D V H T R L Q M P V M G 82
GTG CTG CCT GGG GGA GTT GAC GTT CAC ACC CGG CTG CAG ATG CCT GTG ATG GGC 347
M T P A D D F C Q G T K A A L A G G 100
ATG ACC CCA GCT GAT GAT TTC TGT CAG GGC ACC AAG GCG GCT CTA GCA GGC GGG 401
T T M I L D H V F P D A G V S L L A 118
ACC ACC ATG ATA TTG GAC CAT GTG TTT CCT GAC GCT GGT GTG AGC CTG CTG GCA 455
A Y E Q W R D G G A GCA GAC AGC GCG GCC TGC TGT GAC TAC TCC 136
GCC TAT GAG CAG TGG CGG GAC GGA GCA GAC AGC GCG GCC TGC TGT GAC TAC TCC 509
L H V D I P R W H E S T K E E L E A 154
TTA CAT GTG GAC ATT CCT CGC TGG CAC GAG AGC ACC AAA GAA GAG CTG GAG GCC 563

```

FIG.11

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L V R D K G V N S F L V F M A Y K D	172
CTA GTC AGG GAC AAA GGT GTG AAC TCC TTC CTG GTC TTC ATG GCA TAC AAG GAC	617
R C Q C T D G Q I Y E I F S L I R D	190
AGG TGC CAG TGT ACT GAC GGT CAG ATA TAT GAA ATC TTC AGC CTC ATC CGG GAC	671
L G A V A Q V H A E N G D I V E E E	208
CTG GGA GCT GTG GCC CAG GTG CAC GCA GAA AAT GGG GAC ATC GTG GAG GAG GAA	725
Q K R L L E Q G I T G P E G H V L S	226
CAG AAG CGC CTG CTG GAG CAA GGC ATC ACT GGT CCT GAG GGC CAT GTG CTC AGC	779
H P E E V E A E A V Y R A V T I A K	244
CAC CCA GAA GAG GTA GAG GCC GAG GCT GTG TAC AGA GCA GTC ACC ATT GCC AAG	833
Q A N C P L Y V T K V M S K G A A D	262
CAG GCC AAC TGC CCA CTA TAC TAC GTC ACC AAG GTG ATG AGC AAG GGT GCA GCT GAC	887
M V A Q A K R R G V V V F G E P I T	280
ATG GTT GCC CAA GCC AAG CGC AGG GGG GTG GTC GTC TTT GGG GAA CCT ATC ACT	941
A S L G T D G S H Y W S K N W A K A	298
GCC AGC CTG GGC ACT GAT GGC TCA CAC TAC TGG AGC AAG AAC TGG GCC AAG GCT	995
A A F V T S P P I N P D P T A D H	316
GCA GCC TTT GTC ACT TCA CCC CCT ATC AAC CCG GAC CCT ACT ACT GCA GAC CAC	1049
L T S L L S S G D L Q V T G S A H C	334
CTC ACC TCT CTG CTG TCC AGT GGG GAC CTC CAG GTG ACA GGC AGT GCC CAC TGC	1103

**FIG.11** continued

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T	F	T	T	A	Q	K	A	V	G	K	D	N	F	T	L	I	P	352
ACC	TTC	ACT	ACT	GCC	CAG	AAG	GCT	GTT	GGC	AAA	GAC	AAC	TTC	ACA	CTG	ATC	CCC	1157
E	V	V	N	G	I	E	E	R	M	S	V	V	W	E	K	C	V	370
GAG	GTA	GTC	AAC	GGT	ATA	GAA	GAG	CGC	ATG	TCT	GTG	GTC	TGG	GAG	AAA	TGT	GTG	1211
A	S	G	K	M	D	E	N	E	F	V	A	V	T	S	T	N	A	388
GCT	TCA	GGG	AAA	ATG	GAC	GAG	AAT	GAG	TTC	GTT	GCC	GTG	ACC	AGC	ACA	AAT	GCT	1265
A	K	I	F	N	F	Y	P	R	K	G	R	V	A	V	G	S	D	406
GCC	AAA	ATC	TTC	AAT	TTT	TAC	CCC	AGG	AAG	GGG	CGT	GTG	GCC	GTG	GGC	TCT	GAT	1319
A	D	L	V	I	W	N	P	R	A	T	K	V	I	S	A	K	S	424
GCT	GAC	CTG	GTC	ATC	TGG	AAC	CCC	AGG	GCC	ACG	AAA	GTC	ATC	TCT	GCC	AAG	AGC	1373
H	N	L	N	V	E	Y	N	I	F	E	G	V	E	C	R	G	V	442
CAT	AAC	CTG	AAT	GTA	GAG	TAC	AAC	ATC	TTT	GAA	GGA	GTG	GAG	TGC	CGA	GGA	GTG	1427
P	T	V	V	I	S	Q	G	R	V	V	L	E	D	G	N	L	L	460
CCC	ACG	GTG	GTC	ATA	AGT	CAG	GGC	AGA	GTG	GTG	CTG	GAG	GAC	GGA	AAC	CTG	CTT	1481
V	T	P	G	A	G	R	F	I	P	R	K	T	F	P	D	F	V	478
GTC	ACT	CCA	GGG	GCT	GGC	CGC	TTC	ATT	CCC	CGG	AAG	ACG	TTC	CCG	GAC	TTT	GTC	1535
Y	K	R	I	K	A	R	N	R	L	A	E	I	H	G	V	P	R	496
TAT	AAG	AGG	ATA	AAG	GCT	CGC	AAC	AGG	CTA	GCA	GAG	ATC	CAC	GGT	GTG	CCT	CGA	1589

**FIG.11** continued

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G L Y D G P V H E V M L P A K P G S 514  
 GGC CTG TAC GAC GGC CCT GTG CAT GAA GTG ATG TTA CCT GCC AAG CCA GGA AGT 1643  
  
 G T Q A R A S C S G K I S V P P V R 532  
 GGC ACA CAG GCC CGT GCA TCC TGT TCA GGC AAG ATC TCA GTG CCA CCC GTG CGC 1697  
  
 N L H Q S G F S L S G S Q A D D H I 550  
 AAC CTG CAC CAG TCG GGG TTC AGC CTA TCT GGC TCT CAG GCT GAC GAT CAC ATT 1751  
  
 A R R T A Q K I M A P P G G R S N I 568  
 GCC AGA CGT ACG GCT CAG AAG ATC ATG GCA CCC CCC GGA GGA CGC TCC AAC ATC 1805  
  
 T S L S \*  
 ACG TCT CTT TCC TAG acttggggtcttggcaagctggtgctgtccccactggcagggtgtggtgggac 573  
 gactcacgtcagttagctccttccttctttagattgttattgtgaaaggc 1920

**FIG.11** | continued

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ULIP4 man

GCCGCCCTACCAGAGACCCCCAGGAGCAGG	ATG	TCC	TTC	CAG	GGC	AAG	AAA	AGC	ATC	CCC		10
												61
R I T S D R L L I R G G R I V N D D												28
CGG ATC ACG AGT GAC CGC CTT CTG ATC AGA GGT GGG AGG ATC GTG AAT GAC GAC												115
Q S F Y A D V H V E D G L I K Q I G												46
CAG TCC TTT TAC GCT GAT GTG CAC GTG GAA GAT GGC TTG ATA AAA CAA ATC GGA												169
E N L I V P G G I * T I D A H G L M												64
GAA AAC CTC ATC GTC CCT GGG GGC ATC TAG ACC ATT GAC GCC CAC GGC CTG ATG												223
V L P G G V D V H T R L Q M P V L G												82
GTC CTT CCT GGT GGC GTT GAC GTC CAC ACA AGG CTG CAG ATG CCT GTG GGC												277
M T P A D D F C Q G T K A A L A G G												100
ATG ACA CCG GCT GAC GAC TTC TGT CAG GGC ACC AAG GCA GCG CTA GCA GGA GGA												331
T T M I L D H V F P D T G V S L L A												118
ACC ACC ATG ATC TTG GAC CAC GTC TTC CCC GAC ACC GGT GTG AGC CTG CTG GCG												305
A Y E Q W R E R A D S A A C C D Y S												136
GCC TAC GAG CAG TGG CGG GAG CGG GCG GAC AGC GCG GCC TGC TGC TAC TCC												439
L H V D I T R W H E S I K E E L E A												154
CTG CAC GTG GAC ATC ACC CGA TGG CAT GAG AGC ATC AAG GAG GAG CTG GAG GCC												493

FIG.12

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L V K K E K G G V N S F L V F M A Y K D	172
CTG GTC AAG GAG AAG GGT GTG AAC TTC TTC CTG GTC TTC ATG GCA TAC AAG GAC	547
R C Q C S D S Q M Y E I F S I I R D	190
CGG TGC CAG TGC AGC GAC AGC CAG ATG TAC GAG ATC TTC AGC ATC ATC CGG GAC	601
L G A L A Q V H A E N G D I V E E E	208
CTG GGG GCC TTG GCC CAG GTG CAC GCT GAG AAC GGG GAC ATC GTG GAG GAG GAG	655
Q K R L L E L G I T G P E G H V L S	226
CAG AAG CGG TTG CTG GAG CTC GGC ATC ACT GGC CCC GAG GGC CAC GTG CTC AGC	709
H P E E V E A E A V Y R A V T I A K	244
CAC CCC GAG GAG GTG GAG GCT GAG GCG GTG TAC CGA GCT GTC ACC ATC GCC AAG	763
Q A N C P L Y V T K V M S K G A A D	262
CAG GCA AAC TGC CCG CTG TAC GTC ACC AAG GTG ATG AGC AAG GGG GCG GCC GAC	817
A I A Q A K R R G V V V F G E P I T	280
GCC ATC GCT CAG GCC AAG CGC AGA GGG GTG GTC GTG TTT GGG GAG CCC ATC ACC	871
A S L G T D G S H Y W S K N W A K A	298
GCC AGC CTG GGC ACC GAC GGT TCA CAC TAC TGG AGC AAG AAC TGG GCC AAG GCT	925
A A F V T S P P V N P D P T A D H	316
GCA GCC TTC GTC ACA TCA CCC CCT GTC AAC CCA GAC CCC ACC ACG GCA GAC CAC	979
L T C L L S S G D L Q V T G S A H C	334
CTC ACC TGC TTG CTG TCC AGC GGG GAC CTC CAG GTG ACA GGC AGC GCC CAC TGC	1033

**FIG.12** continued

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T F T T A Q K A V G K D N F A L I P 352  
 ACC TTC ACC ACT GCC CAG AAG GCT GTG GGC AAG GAC AAC TTC GCG CTG ATC CCC 1087  
  
 E G T N G I E E R M S M V W E K C V 370  
 GAG GCC ACC AAC GGC ATT GAG GAG CGC ATG TCG ATG GTC TGG GAG AAA TGT GTG 1141  
  
 A S G K M D E N E F V A V T S T N A 388  
 GCC TCT GGG AAG ATG GAC GAG AAT GAG TTC GTC GCG GTG ACC AGT ACA AAT GCT 1195  
  
 A K I F N F Y P R K G R V A V G S D 406  
 GCC AAA ATC TTC AAT TTT TAC CCA AGG AAG GGG CGA GTG GCT GTG GGC TCT GAC 1249  
  
 A D L V I W N P K A T K I I S A K T 424  
 GCT GAC CTG GTC ATA TGG AAC CCC AAG GCC ACC AAG ATC ATC TCT GCC AAG ACC 1303  
  
 H N L N V E Y N I F E G V E C R G A 442  
 CAC AAT CTG AAC GTG GAG TAC AAC ATC TTC GAG GGA GTG GAG TGC CGG GGA GCG 1357  
  
 P A V V I S Q G R V A L E D G K M F 460  
 CCT GCC GTG GTC ATA AGT CAG GGC CGA GTG GCG CTG GAG GAC GGG AAG ATG TTT 1411  
  
 V T P G A G R F V P R K T F P D F V 478  
 GTC ACC CCG GGG GCG GGC CGC TTC GTC CCT CCG AAA ACA TTC CCG GAC TTT GTG 1465  
  
 Y K R I K A R N R L A E I H G V P R 496  
 TAC AAG AGG ATC AAA GCT CGC AAC AGG CTG GCG GAG ATC CAC GGT GTG CCC CGT 1519

**FIG.12** continued

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G	L	Y	D	G	P	V	H	E	V	M	V	P	A	K	P	G	S	514
GGG	CTG	TAT	GAC	GGG	CCC	GTC	CAC	GAG	GTG	ATG	GTG	CCT	GCC	AAG	CCA	GGG	AGT	1573
G	A	P	A	R	A	S	C	P	G	K	I	S	V	P	P	V	R	532
GGC	GCT	CCG	GCC	CGC	GGC	TCC	TGC	CCA	GGC	AAG	ATC	TCC	GTG	CCT	CCT	GTG	CGC	1627
N	L	H	Q	S	G	F	S	L	S	G	S	Q	A	D	D	H	I	550
AAC	CTA	CAT	CAG	TCG	GGG	TTC	AGC	CTA	TCT	GGG	TCT	CAG	GCT	GAT	GAC	CAC	ATC	1681
A	R	R																553
GCC	CGA	CGC																1690

**FIG.12** continued